MIDDLE ATLANTIC
Region 1
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Exploring and Evaluating the Use of iPad Technology in a First Year Medical School Curriculum
Hofstra North Shore-LIJ School of Medicine
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Executive Summary

The primary goal of this project was to enhance the use of digital technology, specifically iPads and relevant applications (apps), in support of productive learning at the Hofstra North Shore-LIJ School of Medicine and assess the feasibility and preference for this type of technology in self-directed learning and the integrated curriculum. The inaugural School of Medicine class of 40 students began in August 2011 therefore this pilot study, conducted during January – April of 2012, involved a subset of students and faculty in mid year of the first 50 weeks of the curriculum of a new medical school. With this pilot project, 10 iPads with a set configuration of apps, including e-textbook apps, were distributed to cohorts of students and faculty and the same set of apps were provided to participating students and faculty who already owned iPad devices. Students and faculty were targeted in order to learn about the efficacy of using iPad technology from both perspectives. There were a total of 27 participants. The Library staff partnered with other faculty and administrative staff, to structure the initial design of the study, implement the assessments, and provide consultation as requested. Some of the iPads will be added to the library collection and will be available for checkout to students and faculty going forward. All of the current apps will remain on these devices and new textbooks and other apps that are reviewed and recommended will be added.

Minority Populations Served

African Americans: No
American Indians/Alaska Natives: No
Asian Americans: No
Hispanics/Latinos: No
Native Hawaiians and Pacific Islanders: No
Other: No

Approaches and Interventions Used

Our intermediate objectives for this project were to:
1. Determine a list of recommended apps and e-textbook apps to include in the study.
2. Develop an equitable way to recruit participants as it was not possible to provide devices to all students and faculty.
3. Develop a methodology for security and generic accounts.
4. Obtain and load onto devices all needed materials quickly as the time frame for the award period was short.
5. Develop and administer initial, mid-study, and final assessments and subsequently analyze results.
6. Develop and provide training session and supplemental instructional materials.
7. Track all expenditures.
8. Promote the study internally at the University and externally.
9. Seek comparative information from other medical schools providing iPads to students for potential improvement to our project.
10. Develop and implement plan for continued use of iPads and apps after the study period.
11. Provide feedback to School of Medicine administration and discuss future potential iPad implementation.

1. Determine a list of recommended apps and e-textbook apps to include in the study.

The library staff conducted research via the web and with staff at other medical schools to determine apps and e-textbooks recommended for iPads and also met with a group of faculty and students to obtain input from them. The original list was modified slightly to remain within budget and so that sufficient apps could be purchased for students who already owned iPads. It was decided not to include a patient log app since it would not be available to every student. Chapters from e-textbooks on the Inkling platform were purchased that integrated with the content of the current courses.

2. Develop an equitable way to recruit participants as it was not possible to provide devices to all students and faculty.

Volunteer participation forms were developed for students and faculty. There were two five week cohorts for those who used the library iPads in order to allow for more participants. If there were too many volunteers, a lottery would have been conducted, however that was not necessary. Students and faculty who already owned iPads were able to keep all of the apps. As an incentive for the students to participate, it was announced that 4 of the 10 iPads would be given to selected students via a lottery at the end of the study period. To be eligible, students had to attend the training session and complete all of the assessments. The other 6 iPads were kept by the library and will be available for circulation by any students, faculty, or staff.

3. Develop a methodology for security and generic accounts.

The Electronic Services Coordinator of the library staff developed a plan for security of the devices and apps as well as a plan for generic Inkling and Apple accounts so that the library could control the environment. However, users could download additional apps if they desired. From Apple's iPhone Configuration Utility, a configuration profile was created, enforcing passcode policies and few restrictions on the device upon installation. Participants could not alter the profile. Generic accounts were created and maintained by the Electronic Services Coordinator. Accounts were created for applications that required usernames/password login to access or to download additional content. Each device was assigned a device name and physical asset tag. This information was associated to generic accounts assigned to each device per application. Before the completion of the cohorts, participants were advised to backup or transfer their personal content acquired during the study, i.e. photos, notes, and documents. We suggested any form of cloud services or email. The apps and any personal data downloaded by our participants were wiped from the device upon return.

4. Obtain and load onto devices all needed materials quickly as the time frame for the award period was short.

The Library Director and Electronic Services Coordinator ordered all devices and apps and received expedited service from vendors in order to meet our deadline. The Electronic Services Coordinator configured all the devices and processed redeemable accounts for the apps to be provided to participants who owned their own iPad. One Apple ID account was used to download and configure applications for the devices given to participants. The device settings, profiles, and applications were installed on one device, and then replicated simultaneously to the devices remaining via iTunes. Additional content provided by applications via generic user accounts was downloaded per device before deployment to participants.

5. Develop and administer initial, mid-study, and final assessments and subsequently analyze results.

The School of Medicine utilizes Qualtrics software to implement various types of assessments. The Library staff developed the content for all of the assessments and worked with staff from the Office of Assessment and Educational Research to administer them, track completion, and analyze the results. The initial assessment was conducted during the in-person training session.

6. Develop and provide training session and supplemental instructional materials.

The Education and Liaison Librarian and Electronic Services Coordinator developed content and structure for a group training session including demonstration and hands on activity. Anyone who was unable to attend the scheduled group sessions came to an individual session. The Librarian also created a web based LibGuide with additional support materials. The materials created are not publicly available. Participants consulted with these two library staff members when they had any problems or wanted any additional instruction or advice on efficiently utilizing the apps and devices.

7. Track all expenditures.

The Library Director and Electronic Services Coordinator tracked expenditures and submitted invoices for payment through the University. A grant budget was implemented and the Grants Manager submitted all invoices for reimbursement.

8. Promote the study internally at the University and externally.

The Director of Communications for the School of Medicine initiated a press release which was also prominently placed on the School of Medicine website home page.
URL: http://medicine.hofstra.edu/about/news/pressreleases/113011_Ipadgrant.html

Progress on the project was reported at the faculty meetings of the Department of Science Education. The Office of Sponsored Research reports to the University Provost and President regarding successful funded grants and a letter of recognition was received by the Library Director. The Library Director reported informally regarding the project at several library organization meetings and the library staff plans to submit a poster on the project at a future meeting.

9. Seek comparative information from other medical schools providing iPads to students for potential improvement to our project.

The Library Director conducted phone interviews with staff from several libraries around the country. She attended an Associated Medical Schools of New York meeting where the Weill Cornell Medical College initiative was presented. A conference call with the Assistant Dean for Curriculum at the Yale School of Medicine was conducted with participation by all Library staff, the Chairman of the Department of Science Education, and the Senior Associate Dean for Education.

10. Develop and implement plan for continued use of iPads and apps after the study period.

Six of the purchased iPads will become part of the library collection and checked out to users at the end of the project period. All of the apps included in the study will remain on those iPads. It was decided to purchase for the retained iPads the full e-textbook, Bates' Guide to Physical Examination and History Taking, as that title is not available electronically via library subscription. Additional apps will be purchased for these iPads if recommended and reviewed favorably by staff. Four of the purchased iPads were given to selected students who participated in the study, via a lottery.

11. Provide feedback to School of Medicine administration and discuss future potential iPad implementation.

The results of the pilot project and future potential iPad implementation will be discussed at a Curriculum Committee Subcommittee meeting in early May with representation from all of the Deans.

Evaluation Activities

Assessments were developed by the library staff and distributed via links utilizing the Qualtrics software, with the assistance of staff from the Office of Assessment and Educational Research. There is a culture of assessment built into the School of Medicine and both students and faculty are accustomed to evaluating curriculum content and activities in this manner. All participants completed the initial assessment during the training session. Questions included the extent of experience with an iPad, user expectations for usefulness, and what they hoped to achieve by participation. Participants identified themselves as students or faculty. A mid study assessment was conducted with the first cohort but due to vacation schedules it was not conducted for the other cohorts. The final assessment was sent to the cohorts who received library owned iPads a week after the devices were returned to the library. The cohort who owned their own iPads received the same final assessment form. All faculty and all but one student completed the final assessment.

Questions in the final assessment provided data on:
how often participants used the iPads during the case-based learning (PEARLS-Patient-Centered Explorations in Active Reasoning, Learning and Synthesis), interactive lecture sessions, clinical encounters in ICE, and self-directed learning time,
strengths and weaknesses of using the iPad,
frequency of using the various apps,
how useful the iPad and apps were for easier access to educational resources, taking notes, saving time, quality of patient interactions, organization of work or study, sharing of information, access to textbooks, and improving day-to-day classroom activity,
whether the value added from the iPad would be an improvement over just the laptop and smartphone,
and their overall experience in participating in the study.

The top three strengths were portability, ease of access to resource materials and improved note-taking app features. Additional comments included usefulness in saving time, the ease of sharing and collaborating with other students and a preference for the iPad vs. the laptop for class sessions allowing for fewer distractions and better site lines. Top weaknesses were difficulty in using the onscreen keyboard, lack of 3G telecommunication, the limited number of textbooks (i.e. not all of the required textbooks are iPad compatible), non-availability of flash videos, and difficulty for some faculty in adapting to the device.

The assessment results indicate that the overall goal of enhancing the use of digital technology in support of self-directed learning and the integrated curriculum was accomplished. If the library had been able to provide an iPad to every student and more faculty members, that enhancement would be more significant. There was also a preference for using iPad technology now and in the future, particularly in self-directed learning and the case-based small group learning, key components of the school's curriculum. The apps that were used with most frequency were the textbooks, the productivity apps, email, and accessing the Blackboard curriculum sites (despite not having the actual Blackboard app.) The feasibility of using iPads in the future would depend on how well their use could be integrated into the curriculum by faculty, how easily curriculum related content could be accessed, the availability of better keyboards and a stylus for improving note-taking, and wireless connectivity to the LCD screens in all rooms. It is interesting to note that no one mentioned the non-availability of printing from the device as a barrier or weakness. The culture of the school is not to print everything.

Problems or Barriers Encountered

The library staff met throughout the project to discuss problems encountered. If possible the problem was resolved in mid project. Some barriers encountered were not discovered until the final assessment was reviewed. The original design of the project included a patient log app and encouragement of iPad use by some students and their faculty preceptor at the initial clinical experience (ICE) weekly sessions. However, as implementation began, the course director for ICE recommended that the patient log app not be included in the study as it was not possible to provide the same app to all students. Effective use of that app would have involved considerable setup time. The purchased devices were not equipped with 3G telecommunications, necessitating access to a wireless network for internet use. Although the assessment results indicated that some students did use their iPad at the ICE site, others were hesitant to ask their preceptors about access to the physician's wireless network. There were no clinical faculty preceptors who participated formally in the project.

Multiple chapters from several different textbook apps were included in the study via the Inkling platform. The library staff decided to take advantage of the Inkling feature to purchase chapters vs. whole textbooks, which also allowed the inclusion of several different textbooks within the budget. However feedback from a number of students indicated that it was frustrating not to have the entire book accessible.

At the time of the study, a recent update to the device's software was available via ITunes. Many of the apps included as a part of the study required the update in the iOS software for our iPad 1 or iPad 2 owners. Our participants who already owned an iPad updated the iOS software in order to fully participate in the training and study. This directly impacted the course of the training session for a small group of participants. Users who did not have access to a computer during the training had to update the following day, then install and configure the apps with the assistance of the Electronic Services Coordinator.

Hofstra University uses Blackboard as its learning management system, however the university IT Department has not as of yet implemented the Blackboard iPad app. Some students indicated this was a barrier in accessing curriculum materials efficiently on the iPad. It is possible to access the university portal on the iPad including Blackboard, the student Google calendar, and the library web site, but as web sites, not an optimally designed app.

The short time frame for the study was also perceived as a barrier. Students and faculty were somewhat wary of personalizing the device and using it to its full capability, knowing that the device had to be returned in five weeks rather than permanently owning it. Faculty needed more time to prepare integrating the iPad and relevant apps into the curriculum course sessions. The School of Medicine is in its inaugural year and there are constant tweaks to the course content. Faculty found it difficult to set aside time for training (if they were less familiar with mobile technology) and actual integration of collaborative iPad features. In order to use the iPad effectively during interactive lectures, wireless connection from the iPad to the large LCD screens would be needed. The connectors that were purchased were too short.

Continuation Plans

Six of the purchased iPads will become part of the library collection and available for checkout to users at the end of the project period. All of the apps included in the study will remain on those iPads. It was decided to purchase for the retained iPads the full e-textbook, Bates' Guide to Physical Examination and History Taking, as that title is not available electronically via library subscription. Additional apps will be purchased for these iPads if recommended and reviewed favorably by staff. Four of the purchased iPads were given to selected students who participated in the study, via a lottery. The results of the pilot project and future potential iPad implementation will be discussed at a Curriculum Committee Subcommittee meeting in early May with representation from all of the Deans.

Impact

This NN/LM funded pilot project was a great opportunity for our library staff to take the lead in exploring roles for new mobile technology integrated into the Hofstra North Shore-LIJ School of Medicine curriculum. The team approach in planning and implementation was a positive experience, involving all of our library staff as well as partnering with other faculty and staff at the school in targeted areas. The students were very appreciative of the opportunity to participate in the study and were both cooperative and expressive in providing feedback through the assessments. The successful award funding was reported through the Hofstra University Office of Sponsored Research to the University Provost and President, raising the visibility of the School of Medicine library within the school's administration.

Six of the iPads will be added to the library collection and will be available for checkout to students and faculty. All of the current apps will remain on these devices and new textbooks and other apps that are reviewed and recommended will be added. Usage will continue to be tracked. The results of the pilot project and future potential iPad implementation at the School of Medicine will be discussed at a Curriculum Committee Subcommittee meeting in early May with representation from all of the Deans. The library staff plans to submit a poster about the project at a future professional meeting.

One of the assessment questions asked: What is your opinion of the future use of iPad/tablet technology in undergraduate medical education? Some of the answers:
"It will undoubtedly be essential due to its portability and high functionality, especially in team or group based learning settings where laptops can be cumbersome and can interfere with discussion."
"I think it's a great way to keep textbooks, to look up information, to share information, and to download apps that will help with education. I think it is something worth pursuing, though I still prefer textbooks."

Lessons Learned

Utilizing the Hofstra North Shore-LIJ School of Medicine's standard assessment software allowed for easy construction of the assessment tools and strengthened compliance. The narrative text questions provided the most useful information in the analysis. Some sample comments from students:
"The best use of the iPad was for reading textbooks at school but especially off campus. Most of our textbooks are online which is very convenient and the iPad is portable. It made life easier to not have to carry a laptop around everywhere I go. Using Keynote during lectures to take notes on the actual lecture slides proved to be very helpful."
"Easy to read from, especially on the way to somewhere such as EMT shift. Very lightweight to carry everywhere. Programs such as iAnnotate and Inkling makes taking notes on the books very easy."
"It needs to be integrated into the curriculum, not merely used as an add-on. All readings should be made available on it, either as Inkling, ibooks, or pdf."

The assessment results indicate that the overall goal of enhancing the use of digital technology in support of self-directed learning and the integrated curriculum was accomplished. If the library had been able to provide an iPad to every student and more faculty members, that enhancement would be more significant. There was also a preference for using iPad technology now and in the future, particularly in self-directed learning and PEARLS, the case-based small group learning, key components of the school's curriculum. The apps that were used with most frequency were the textbooks, the productivity apps, email, and accessing the Blackboard curriculum sites (despite not having the actual Blackboard app). The clinically oriented apps were used less often but that is not surprising since a higher percentage of student time during the first 50 weeks of the curriculum is spent in basic sciences learning. Students who used the iPad at their clinical experience sites found the portability to be very useful.

The project plan of dividing the participants into two five week cohorts allowed for additional participants, but became a barrier for some who indicated the time frame was too short for in-depth use of all the iPad capabilities and the apps we requested they use. Other libraries who plan to implement similar projects may want to take this time factor into consideration. The project plan also relied on participants to come to the library staff if they needed additional help or instruction, after the initial training sessions. Although some students and faculty did take advantage of this individualized assistance, future projects might push out more instructional opportunities, such as a lunch and learn session, open sharing sessions and specific models for faculty to integrate iPad usage into the classroom sessions.

This is the inaugural year for the School of Medicine introducing an innovative curriculum that combines basic science with hands-on clinical experience, stressing an integrated team based model of learning. Most of the faculty participants were also actively involved in teaching courses during the study period and simultaneously responsible for developing last minute changes to the content and course features. It was a challenge for the faculty to set aside time to integrate the iPad technology into the curriculum and the school's interactive formats. Future projects might be designed with a time frame that would allow more lead time for faculty to better prepare for integration of the mobile technology into their course sessions.

Other

URL: http://medicine.hofstra.edu/about/news/pressreleases/113011_Ipadgrant.html

Attachment 1: AR summary data: Subcontractor activities